Understanding Factors that Influence Success Rate of Students in Computer Literacy

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Extended Abstract:

Related Studies

The rapidly changing end-user computing environment requires an informed recipient of information who can play an active role in the design of information systems to capture, retrieve and interpret data [6]. We need our students to develop practical skills as well as thorough theoretical understanding of IT concepts so that they can effectively function in the constantly evolving technological future. UWC students typically come from varied academic and socio-economic backgrounds. Many are from educationally disadvantaged communities that have had little exposure to technology [4]. Monyeki [2] asserts that it is simplistic to assume that studies conducted on students from other education departments in South Africa will hold for students from these educationally disadvantaged communities, hence the reason for our study.

Relevance

Computer illiteracy, analogous to illiteracy, is an intellectual impediment in modern society. Since a tertiary education is assumed to prepare a student for a modern working environment, computer literacy is of utmost importance. Thus the importance and relevance of the research in the South African context especially since UWC is committed to meaningfully contribute to the national RDP effort.

Study Objective

We feel that the failure rate of the computer literacy course has been unacceptably high. Definitions of computer literacy change as computer hardware and software change. In general, and in this course, it is considered to be the knowledge of concepts, definitions, social issues and applications of computers as well as the ability to use and integrate computer applications software. Of the students that registered (516 in 1994, 422 in 1993) many failed to write the final examinations (414 wrote the final examinations in 1994, 384 in 1993) and of those that wrote, only 35% were successful. Even though the way the course is presented has been revised each year, the success rate remains a problem. This research is directed towards trying to understand which factors contribute to the failure rate in the computer literacy course.

Current Course Curricula

Electronic Data Processing (EDP)

The course comprises a practical and theoretical section. In the practical section the student is introduced to an operating system (DOS), a word-processor as well as a spreadsheet. For the theoretical section, the following book is prescribed:

Long, Larry 1994. *Introduction to Computers and Information Systems.* Fourth Edition. Prentice-Hall: New Jersey.

Statistics (STATS)

An introductory statistics course is based on the following book:

Wegner, Trevor 1994. *Applied Business Statistics.* Juta: Cape Town.

Design and Method

Questionnaires were handed out at the onset and at the end of the 13 week EDP course during 1994. The emphasis of the first questionnaire was to collect background information such as: gender, home language, age, prior exposure to computers and the student's perception of computers and technology. The second questionnaire tried to ascertain possible changes in opinions towards technology after completion of the EDP course as well as impressions of the contents and presentation of the course.

Interviews were conducted with a few students using the "Reflective Conversation" protocol [5] to obtain additional information that could not be extracted by means of a conventional questionnaire.

Main Results

Quantitative Research Findings

Descriptive Statistics

A total of 305 questionnaires were analyzed after some questionnaires were excluded due to obvious invalid answers to questions.

The age distribution was as follows: 65.8% were younger than 23 years, the remainder (34.2%) were 23 years and older. The majority of the students in this study were enrolled for a B.Com. degree (72%), a small proportion were enrolled for a B.A. degree (14.2%), a few for the B.Sc.degree (3%), 1.4% for an Honours degree, and the remaining degrees or diplomas constituted 9.5%.

The home languages of students were divided as follows: 35.5% Xhosa, 33.4% English, 20.3% Afrikaans, 3% Zulu and 7.8% languages such as South Sotho, North Sotho, Shangaan, Tswana, etc. Only 17.4% of students was exposed to computer technology at secondary school level. This exposure drops to 6.2% at primary school level. In general 32.8% of students have access to a computer, whereas 18% of students have a computer at home.

The majority of students (70 -80%) feel positive about computers and related technologies and find working with computers enjoyable and stimulating.

Inferential Statistics

Cross-tabulations of similar questions, using the Chi-square test [9], indicate that the questionnaires were answered consistently.

Pre- and Post-questionnaire comparisons

The pre- and post-questionnaire results were compared by means of McNemar Tests [9] to find out how perceptions had changed. The post-questionnaire compared with the pre-questionnaire, indicated a negative shift in attitude. A smaller majority of students feel positive towards computers and related technology subsequently.

Mark Comparisons

A comparison of marks obtained in the computer literacy course and those obtained by the same students in an introductory statistics course yielded a surprisingly low correlation (Pearson correlation, 0.43)[9].

When compared to students with any other home language, students with English or Afrikaans as their home language obtained significantly higher EDP theory and statistics marks (Mann-Whitney test, p=0.0008, p=0.0104, respectively)[9]. Home language did not significantly influence EDP practical marks.

Male students obtained significantly higher EDP theory marks when compared to females (Mann-Whitney test, p=0.0031).

Student Background and its influence on Perception of Computers/Technology

Gender

A few questions concerned the student's opinion on the use of technology. A significant number of females were more apprehensive about using the computer than males. This tendency is supported in the literature. Reinen and Plomp [3] assert that women rate themselves lower on computer knowledge than men.

Age

In general the younger students (younger than 23) were more confident in their own abilities and rated their proficiency, in the use of a computer, higher than that of the older group (23 years and older). However the older student found work on computers more stimulating and enjoyable than the younger students. It is interesting to note that the majority of Xhosa and Zulu speaking students are older than 23 years of age.

Language

Boughey [1] asserts that learners who are proficient readers in their first language are able to transfer those skills to reading in a second language, provided a threshold of language proficiency in the second language has been reached. This could be the most important contributing factor to the language disparity mentioned in the mark comparissons above.

To simplify comparisons, students were divided into two home language groups: English and Afrikaans versus all other languages. Exposure to technology at school level was significantly higher in the group whose home language is Afrikaans or English. Significantly more students of this group feel that practicals should be a compulsory part of the EDP course (Chi-square, p=0.011).

A significantly larger proportion of the students whose home language is a language other than English or Afrikaans, agree that they would enjoy working with computers (Chi-square, p=0.0004) and find working on the computer enjoyable and stimulating (Chi-square, p=0.001). They will work until they obtain the answer (Chi-square, p=0.007). Contrary to this statement more students in the language group whose mother tongue is not Afrikaans or English, want to do as little work with computers as possible (Chi-square, p=0.012).

Qualitative Research Findings

Interviews, using the "Reflective Conversation" protocol [5] to investigate additional information, were conducted with 8 randomly chosen students. The students who are motivated and prepared to spend extra time working on the computer seem to achieve a pass mark for EDP. This was also found by Janice Woodrow [8]. She emphasizes that time spent at the keyboard is a significant determinant of computer literacy achievement.

Initial Interpretation of Research Outcome

Why do so many students fail the EDP course? Could it possibly be that B.Com. students are seldom exposed to the type of practical skills needed for this course? Or is the language issue the prime aggravating factor?

Why did students -- contrary to expectations -- after being exposed to computer literacy, become disillusioned by it? Woodrow noted a similar tendency in her study: "Positive attitudes are generally assumed to motivate learning and achievement. However, the affective entry level behaviour, prior computer attitudes, was not significantly correlated with either computer literacy achievement or with prior computer literacy"[7]. Can it inter alia be ascribed to unrealistic expectations created by the media?

Could some of the problems experienced with practical sessions be overcome by introducing the student to a more user-friendly environment such as the Macintosh computer (with an operating system consisting mostly of icons) or even the IBM Windows environment?

This study indicates the need for further research to understand which factors could aid in obtaining higher pass rates in computer literacy courses at UWC, assuming that pass rates reliably translate into computer literacy. We consider it to be important that computer literacy education be made available to all students on campus. Curricula should be adapted to accommodate students with different needs and backgrounds.

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